

ADT PLM

Programmer's Learning Machine

Matthieu Nicolas

IJD Seminar, 2016-02-02

1 Presentation of PLM

- Purposes
- Demo
- About PLM
- Architecture

2 To a web app

- Goals
- How?

3 Assessment of user's code

- Challenges
- Extraction of the execution component
- Docker

4 Result

5 Next steps

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Presentation of PLM

Purposes

- Application to learn programming.

Presentation of PLM

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- Allows students to progress at their own speed...

Presentation of PLM

Purposes

- Application to learn programming.
- Allows students to progress at their own speed...
- ... while the teacher helps the ones having trouble.

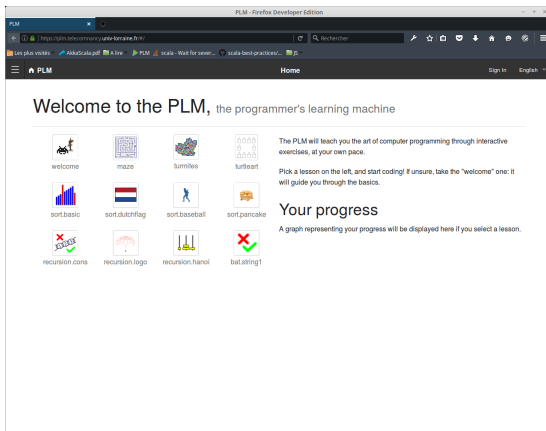
Presentation of PLM

Purposes

- Application to learn programming.
- Allows students to progress at their own speed...
- ... while the teacher helps the ones having trouble.
- Used at TELECOM Nancy since 2008.

Presentation of PLM

Quick demo



- Available at <https://plm.telecomnancy.univ-lorraine.fr>

Presentation of PLM

12 lessons, 200 exercises

PLM - Mozilla Firefox

https://plm.univ-lorraine.fr/la/lessons/maze/maze-wallfollower/wallfollowerMaze

Les plus visités Linux Mint Community Forums Blog News NinjaMock - free tool... Spotify Web Player Wau The Most Amaz... Coursa P2P

PLM Maze / WallFollowerMaze Se connecter Java Français

World Objective



Résultats de l'exécution

Éditeur de code:

```
public void run() {  
    // ...  
}
```

Cas de tests:

Another labyrinth Labyrinth

Presentation of PLM

12 lessons, 200 exercises

PLM - Mozilla Firefox

https://plm.univ-lorraine.fr/.../recursion/hanoi/hanoi.lessons/hanoi.Hanoi

Rechercher

Les plus visités Linux Mint Community Forums Blog News NinjaMock - free tool... Spotify Web Player Wau The Most Amaz... Coursa P2P

PLM Recursion.hanoi / HanoiBoard Se connecter Java Français

World Objective

0 Move



Résultats de l'exécution

Cas de tests:

solve(0,1,2) solve(1,2,0) solve(2,0,1)

Éditeur de code: Réinitialiser API

```
public void hanoi(int height, int src, int other, int dest) {  
    ...  
}
```

Presentation of PLM

12 lessons, 200 exercises

PLM - Mozilla Firefox

https://plm.univ-lorraine.fr/ta/lessons/recursion/logo/recursion/logo/tree.Tre

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PLM Recursion.logo / Tree Se connecter Java Français

World Objective



Résultats de l'exécution

Éditeur de code: Réinitialiser API

```
public void tree(int steps, double length, double angle, double shrink) {  
    // ...  
}
```

Cas de tests:

tree(10,100,90,0.68)	▶	tree(10,80,45,0.7)	▶
tree(7,75,15,0.8)	▶	tree(7,75,30,0.8)	▶

Presentation of PLM

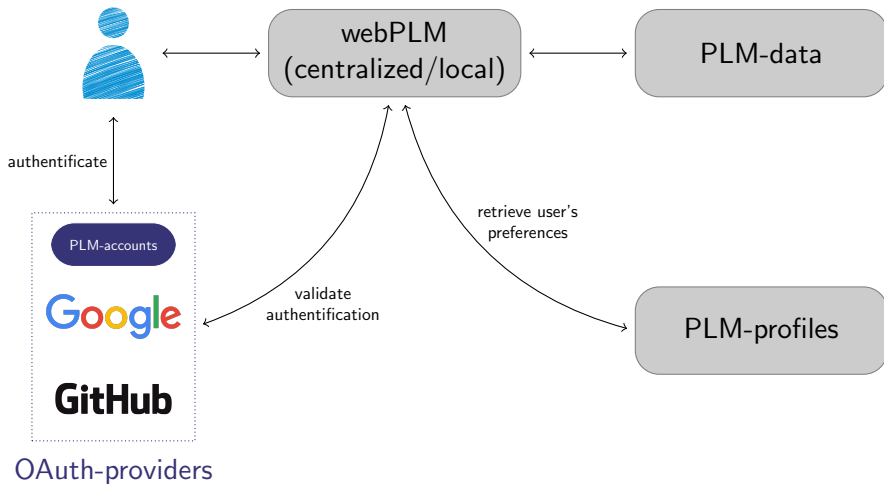
Languages and programming languages

- Available languages:
 - English
 - French
 - Brazilian Portuguese
- Supported programming languages:



Presentation of PLM

Application's architecture



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To a web app

Evolution of the project

- Formerly a fat client
 - Written in Java

To a web app

Evolution of the project

- Formerly a fat client
 - Written in Java
- Switch to a web application
 - Server implemented in Scala using *PlayFramework*
 - User interface written in Javascript using *AngularJS* and *Foundation*



To a web app

Motivations

- More user-friendly
- Aim to setup SPOC¹ and MOOC²
- But don't have the time and means for a reboot

¹Small Private Online Course

²Massive Open Online Course

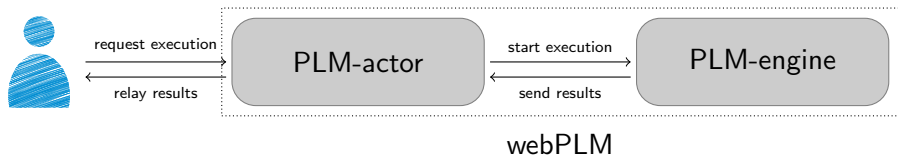
To a web app

Chosen solution

- Implemented a headless version of PLM: *PLM-engine*
 - Provide all PLM's content and methods
 - But without a user interface
 - Need to
- Designed a communication protocol between the server and the client
 - User's actions are sent to server as JSON messages
- Only need to implement an interpreter
 - Parse and messages received from the client
 - Query or command PLM-engine according to the message
 - Send back result or ack to the client

To a web app

Interactions between components



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Assessment of user's code

Limits

- Run on the same machine, same JVM

Assessment of user's code

Limits

- Run on the same machine, same JVM
- How to protect ourselves from users' rookie mistakes?
 - Infinite loops

Assessment of user's code

Limits

- Run on the same machine, same JVM
- How to protect ourselves from users' rookie mistakes?
 - Infinite loops
- And from more malicious "mistakes"?
 - Infinite thread creation
 - Endless file creation

Assessment of user's code

Limits

- Run on the same machine, same JVM
- How to protect ourselves from users' rookie mistakes?
 - Infinite loops
- And from more malicious "mistakes"?
 - Infinite thread creation
 - Endless file creation
- And from *System.exit(whatever)*?

Assessment of user's code

Limits

- Run on the same machine, same JVM
- How to protect ourselves from users' rookie mistakes?
 - Infinite loops
- And from more malicious "mistakes"?
 - Infinite thread creation
 - Endless file creation
- And from *System.exit(whatever)*?
- Scalability issues

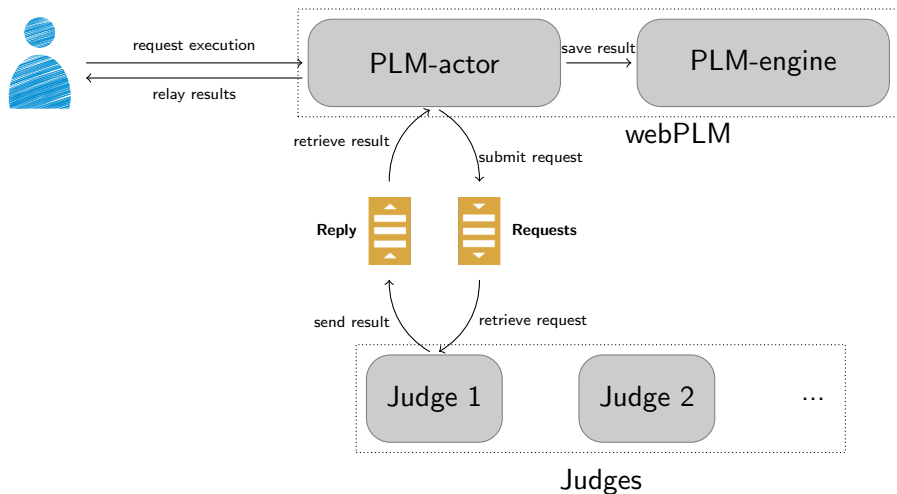
Assessment of user's code

Chosen solution

- Delegate the execution to workers
 - Called *Judges* in the litterature
 - Use PLM-engine as well
 - Execute user's code and send back result to webPLM

Assessment of user's code

Architecture with judges



Assessment of user's code

Implementation

- Distribute workload using message queues
 - One queue for requests
 - One queue per result

Assessment of user's code

Implementation

- Distribute workload using message queues
 - One queue for requests
 - One queue per result
- *Let it crash* strategy
 - Prevent obvious issues with a security manager
 - Handle timeout and crash

Assessment of user's code

Pros and cons

- Pros:
 - Allow to run code without impacting webPLM's performances
 - Meet the scalability requirements

Assessment of user's code

Pros and cons

- Pros:
 - Allow to run code without impacting webPLM's performances
 - Meet the scalability requirements
- Cons:
 - Make sure to use the right version of PLM
 - Need to deploy them easily
 - Should restart them after each execution
 - Have to restrict their resources usage

Assessment of user's code

Docker

- Lightweight virtualization tool
- Build image of your application
- Run containers based on images



Assessment of user's code

Example of Dockerfile

- Dockerfiles describe how to set up the application

```
Dockerfile
1 FROM node:latest
2
3 MAINTAINER Matthieu Nicolas, matthieu.nicolas@inria.fr
4
5 WORKDIR /app
6
7 # Required for PhantomJS
8 RUN apt-get install -y bzip2
9
10 # Install Mean.JS Prerequisites
11 RUN npm install -g grunt-cli
12 RUN npm install -g bower
13
14 # Install Mean.JS packages
15 ADD package.json /app/package.json
16 RUN npm install
17
18 # Manually trigger bower. Why doesnt this work via npm install?
19 ADD .bowerrc /app/.bowerrc
20 ADD bower.json /app/bower.json
21 RUN bower install --config.interactive=false --allow-root
22
23 # Make everything available for start
24 ADD . /app
25
26 ENV NODE_ENV production
27
28 # Port 3000 for server
29 # Port 35729 for livereload
30 EXPOSE 3000 35729
31 CMD ["grunt"]
```

- Run *docker build -t tag /path/to/Dockerfile* to build the image
- Start containers with *docker run tag*

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1 FROM node:latest~
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- Run *docker build -t tag /path/to/Dockerfile* to build the image
- Start containers with *docker run tag*

Assessment of user's code

More about *docker run*

- Can also manage
 - Ports

Assessment of user's code

More about *docker run*

- Can also manage
 - Ports
 - Volumes

Assessment of user's code

More about *docker run*

- Can also manage
 - Ports
 - Volumes
 - Links between containers

Assessment of user's code

More about *docker run*

- Can also manage
 - Ports
 - Volumes
 - Links between containers
 - Environment variables
 - Runtime constraints on resources
 - Restart policies
 - And a **lot more**

Assessment of user's code

More about *docker run*

- Can also manage
 - Ports
 - Volumes
 - Links between containers
 - Environment variables
 - Runtime constraints on resources
 - Restart policies
 - And a **lot more**
- Commands can become quite complex

```
docker run -p 443:9443 -link plm-accounts:accounts -v  
~/webPLM/logs/:/app/webplm-dist/logs webPLM
```


Assessment of user's code

Docker-compose

- Tool to easily deploy multi-containers applications

```
docker-compose.yml
1  nginx:
2    image: nginx
3    ports:
4      - "80:80"
5
6  messagequeue:
7    image: rabbitmq:3-management
8    ports:
9      - "5672:5672"
10     - "15672:15672"
11
12  plm:
13    image: webplm
14    volumes:
15      - ~/.plm:/root/.plm
16      - ~/webPLM/logs:/app/webplm-dist/logs
17    ports:
18      - "443:9443"
19    environment:
20      GITHUB_CLIENT_SECRET:
21      GOOGLE_CLIENT_SECRET:
22      PLMACCOUNTS_CLIENT_SECRET:
23      GITHUB_ACCESS_TOKEN:
24    links:
25      - accounts
26      - profiles
27      - messagequeue:messageq
28
29  accounts:
30    image: plm-accounts
31
32  profiles:
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597    ports:
598      - "27017:27017"
599
600  links:
601    - accounts
602    - profiles
603    - messagequeue:messageq
604
605  accounts:
606    image: plm-accounts
607
608  profiles:
609    image: plm-profiles
610
611  db:
612    image: mongo
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616      - "27017:27017"
617
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629  db:
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670      - "27017:27017"
671
672  links:
673    - accounts
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675    - messagequeue:messageq
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680  profiles:
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691    - accounts
692    - profiles
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706      - "27017:27017"
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710    - profiles
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716  profiles:
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719  db:
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723    ports:
724      - "27017:27017"
725
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727    - accounts
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729    - messagequeue:messageq
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731  accounts:
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734  profiles:
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737  db:
738    image: mongo
739    volumes:
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741    ports:
742      - "27017:27017"
743
744  links:
745    - accounts
746    - profiles
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760      - "27017:27017"
761
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763    - accounts
764    - profiles
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770  profiles:
771    image: plm-profiles
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778      - "27017:27017"
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782    - profiles
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806  profiles:
807    image: plm-profiles
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809  db:
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811    volumes:
812      - ~/.mongodb/data:/data/db
813    ports:
814      - "27017:27017"
815
816  links:
817    - accounts
818    - profiles
819    - messagequeue:messageq
820
821  accounts:
822    image: plm-accounts
823
824  profiles:
825    image: plm-profiles
826
827  db:
828    image: mongo
829    volumes:
830      - ~/.mongodb/data:/data/db
831    ports:
832      - "27017:27017"
833
834  links:
835    - accounts
836    - profiles
837    - messagequeue:messageq
838
839  accounts:
840    image: plm-accounts
841
842  profiles:
843    image: plm-profiles
844
845  db:
846    image: mongo
847    volumes:
848      - ~/.mongodb/data:/data/db
849    ports:
850      - "27017:27017"
851
852  links:
853    - accounts
854    - profiles
855    - messagequeue:messageq
856
857  accounts:
858    image: plm-accounts
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860  profiles:
861    image: plm-profiles
862
863  db:
864    image: mongo
865    volumes:
866      - ~/.mongodb/data:/data/db
867    ports:
868      - "27017:27017"
869
870  links:
871    - accounts
872    - profiles
873    - messagequeue:messageq
874
875  accounts:
876    image: plm-accounts
877
878  profiles:
879    image: plm-profiles
880
881  db:
882    image: mongo
883    volumes:
884      - ~/.mongodb/data:/data/db
885    ports:
886      - "27017:27017"
887
888  links:
889    - accounts
890    - profiles
891    - messagequeue:messageq
892
893  accounts:
894    image: plm-accounts
895
896  profiles:
897    image: plm-profiles
898
899  db:
900    image: mongo
901    volumes:
902      - ~/.mongodb/data:/data/db
903    ports:
904      - "27017:27017"
905
906  links:
907    - accounts
908    - profiles
909    - messagequeue:messageq
910
911  accounts:
912    image: plm-accounts
913
914  profiles:
915    image: plm-profiles
916
917  db:
918    image: mongo
919    volumes:
920      - ~/.mongodb/data:/data/db
921    ports:
922      - "27017:27017"
923
924  links:
925    - accounts
926    - profiles
927    - messagequeue:messageq
928
929  accounts:
930    image: plm-accounts
931
932  profiles:
933    image: plm-profiles
934
935  db:
936    image: mongo
937    volumes:
938      - ~/.mongodb/data:/data/db
939    ports:
940      - "27017:27017"
941
942  links:
943    - accounts
944    - profiles
945    - messagequeue:messageq
946
947  accounts:
948    image: plm-accounts
949
950  profiles:
951    image: plm-profiles
952
953  db:
954    image: mongo
955    volumes:
956      - ~/.mongodb/data:/data/db
957    ports:
958      - "27017:27017"
959
960  links:
961    - accounts
962    - profiles
963    - messagequeue:messageq
964
965  accounts:
966    image: plm-accounts
967
968  profiles:
969    image: plm-profiles
970
971  db:
972    image: mongo
973    volumes:
974      - ~/.mongodb/data:/data/db
975    ports:
976      - "27017:27017"
977
978  links:
979    - accounts
980    - profiles
981    - messagequeue:messageq
982
983  accounts:
984    image: plm-accounts
985
986  profiles:
987    image: plm-profiles
988
989  db:
990    image: mongo
991    volumes:
992      - ~/.mongodb/data:/data/db
993    ports:
994      - "27017:27017"
995
996  links:
997    - accounts
998    - profiles
999    - messagequeue:messageq
1000
1001  accounts:
1002    image: plm-accounts
1003
1004  profiles:
1005    image: plm-profiles
1006
1007  db:
1008    image: mongo
1009    volumes:
1010      - ~/.mongodb/data:/data/db
1011    ports:
1012      - "27017:27017"
1013
1014  links:
1015    - accounts
1016    - profiles
1017    - messagequeue:messageq
1018
1019  accounts:
1020    image: plm-accounts
1021
1022  profiles:
1023    image: plm-profiles
1024
1025  db:
1026    image: mongo
1027    volumes:
1028      - ~/.mongodb/data:/data/db
1029    ports:
1030      - "27017:27017"
1031
1032  links:
1033    - accounts
1034    - profiles
1035    - messagequeue:messageq
1036
1037  accounts:
1038    image: plm-accounts
1039
1040  profiles:
1041    image: plm-profiles
1042
1043  db:
1044    image: mongo
1045    volumes:
1046      - ~/.mongodb/data:/data/db
1047    ports:
1048      - "27017:27017"
1049
1050  links:
1051    - accounts
1052    - profiles
1053    - messagequeue:messageq
1054
1055  accounts:
1056    image: plm-accounts
1057
1058  profiles:
1059    image: plm-profiles
1060
1061  db:
1062    image: mongo
1063    volumes:
1064      - ~/.mongodb/data:/data/db
1065    ports:
1066      - "27017:27017"
1067
1068  links:
1069    - accounts
1070    - profiles
1071    - messagequeue:messageq
1072
1073  accounts:
1074    image: plm-accounts
1075
1076  profiles:
1077    image: plm-profiles
1078
1079  db:
1080    image: mongo
1081    volumes:
1082      - ~/.mongodb/data:/data/db
1083    ports:
1084      - "27017:27017"
1085
1086  links:
1087    - accounts
1088    - profiles
1089    - messagequeue:messageq
1090
1091  accounts:
1092    image: plm-accounts
1093
1094  profiles:
1095    image: plm-profiles
1096
1097  db:
1098    image: mongo
1099    volumes:
1100      - ~/.mongodb/data:/data/db
1101    ports:
1102      - "27017:27017"
1103
1104  links:
1105    - accounts
1106    - profiles
1107    - messagequeue:messageq
1108
1109  accounts:
1110    image: plm-accounts
1111
1112  profiles:
1113    image: plm-profiles
1114
1115  db:
1116    image: mongo
1117    volumes:
1118      - ~/.mongodb/data:/data/db
1119    ports:
1120      - "27017:27017"
1121
1122  links:
1123    - accounts
1124    - profiles
1125    - messagequeue:messageq
1126
1127  accounts:
1128    image: plm-accounts
1129
1130  profiles:
1131    image: plm-profiles
1132
1133  db:
1134    image: mongo
1135    volumes:
1136      - ~/.mongodb/data:/data/db
1137    ports:
1138      - "27017:27017"
1139
1140  links:
1141    - accounts
1142    - profiles
1143    - messagequeue:messageq
1144
1145  accounts:
1146    image: plm-accounts
1147
1148  profiles:
1149    image: plm-profiles
1150
1151  db:
1152    image: mongo
1153    volumes:
1154      - ~/.mongodb/data:/data/db
1155    ports:
1156      - "27017:27017"
1157
1158  links:
1159    - accounts
1160    - profiles
1161    - messagequeue:messageq
1162
1163  accounts:
1164    image: plm-accounts
1165
1166  profiles:
1167    image: plm-profiles
1168
1169  db:
1170    image: mongo
1171    volumes:
1172      - ~/.mongodb/data:/data/db
1173    ports:
1174      - "27017:27017"
1175
1176  links:
1177    - accounts
1178    - profiles
1179    - messagequeue:messageq
1180
1181  accounts:
1182    image: plm-accounts
1183
1184  profiles:
1185    image: plm-profiles
1186
1187  db:
1188    image: mongo
1189    volumes:
1190      - ~/.mongodb/data:/data/db
1191    ports:
1192      - "27017:27017"
1193
1194  links:
1195    - accounts
1196    - profiles
1197    - messagequeue:messageq
1198
1199  accounts:
1200    image: plm-accounts
1201
1202  profiles:
1203    image: plm-profiles
1204
1205  db:
1206    image: mongo
1207    volumes:
1208      - ~/.mongodb/data:/data/db
1209    ports:
1210      - "27017:27017"
1211
1212  links:
1213    - accounts
1214    - profiles
1215    - messagequeue:messageq
1216
1217  accounts:
1218    image: plm-accounts
1219
1220  profiles:
1221    image: plm-profiles
1222
1223  db:
1224    image: mongo
1225    volumes:
1226      - ~/.mongodb/data:/data/db
1227    ports:
1228      - "27017:27017"
1229
1230  links:
1231    - accounts
1232    - profiles
1233    - messagequeue:messageq
1234
1235  accounts:
1236    image: plm-accounts
1237
1238  profiles:
1239    image: plm-profiles
1240
1241  db:
1242    image: mongo
1243    volumes:
1244      - ~/.mongodb/data:/data/db
1245    ports:
1246      - "27017:27017"
1247
1248  links:
1249    - accounts
1250    - profiles
1251    - messagequeue:messageq
1252
1253  accounts:
1254    image: plm-accounts
1255
1256  profiles:
1257    image: plm-profiles
1258
1259  db:
1260    image: mongo
1261    volumes:
1262      - ~/.mongodb/data:/data/db
1263    ports:
1264      - "27017:27017"
1265
1266  links:
1267    - accounts
1268    - profiles
1269    - messagequeue:messageq
1270
1271  accounts:
1272    image: plm-accounts
1273
1274  profiles:
1275    image: plm-profiles
1276
1277  db:
1278    image: mongo
1279    volumes:
1280      - ~/.mongodb/data:/data/db
1281    ports:
1282      - "27017:27017"
1283
1284  links:
1285    - accounts
1286    - profiles
1287    - messagequeue:messageq
1288
1289  accounts:
1290    image: plm-accounts
1291
1292  profiles:
1293    image: plm-profiles
1294
1295  db:
1296    image: mongo
1297    volumes:
1298      - ~/.mongodb/data:/data/db
1299    ports:
1300      - "27017:27017"
1301
1302  links:
1303    - accounts
1304    - profiles
1305    - messagequeue:messageq
1306
1307  accounts:
1308    image: plm-accounts
1309
1310  profiles:
1311    image: plm-profiles
1312
1313  db:
1314    image: mongo
1315    volumes:
1316      - ~/.mongodb/data:/data/db
1317    ports:
1318      - "27017:27017"
1319
1320  links:
1321    - accounts
1322    - profiles
1323    - messagequeue:messageq
1324
1325  accounts:
1326    image: plm-accounts
1327
1328  profiles:
1329    image: plm-profiles
1330
1331  db:
1332    image: mongo
1333    volumes:
1334      - ~/.mongodb/data:/data/db
1335    ports:
1336      - "27017:27017"
1337
1338  links:
1339    - accounts
1340    - profiles
1341    - messagequeue:messageq
1342
1343  accounts:
1344    image: plm-accounts
1345
1346  profiles:
1347    image: plm-profiles
1348
1349  db:
1350    image: mongo
1351    volumes:
1352      - ~/.mongodb/data:/data/db
1353    ports:
1354      - "27017:27017"
1355
1356  links:
1357    - accounts
1358    - profiles
1359    - messagequeue:messageq
1360
1361  accounts:
1362    image: plm-accounts
1363
1364  profiles:
1365    image: plm-profiles
1366
1367  db:
1368    image: mongo
1369    volumes:
1370      - ~/.mongodb/data:/data/db
1371    ports:
1372      - "27017:27017"
1373
1374  links:
1375    - accounts
1376    - profiles
1377    - messagequeue:messageq
1378
1379  accounts:
1380    image: plm-accounts
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1382  profiles:
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1384
1385  db:
1386    image: mongo
1387    volumes:
1388      - ~/.mongodb/data:/data/db
1389    ports:
1390      - "27017:27017"
1391
1392  links:
1393    - accounts
1394    - profiles
1395    - messagequeue:messageq
1396
1397  accounts:
1398    image: plm-accounts
1399
1400  profiles:
1401    image: plm-profiles
1402
1403  db:
1404    image: mongo
1405    volumes:
1406      - ~/.mongodb/data:/data/db
1407    ports:
1408      - "27017:27017"
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1411    - accounts
1412    - profiles
1413    - messagequeue:messageq
1414
1415  accounts:
1416    image: plm-accounts
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1418  profiles:
1419    image: plm-profiles
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1421  db:
1422    image: mongo
1423    volumes:
1424      - ~/.mongodb/data:/data/db
1425    ports:
1426      - "27017:27017"
1427
1428  links:
1429    - accounts
1430    - profiles
1431    - messagequeue:messageq
1432
1433  accounts:
1434    image: plm-accounts
1435
1436  profiles:
1437    image: plm-profiles
1438
1439  db:
1440    image: mongo
1441    volumes:
1442      - ~/.mongodb/data:/data/db
1443    ports:
1444      - "27017:27017"
1445
1446  links:
1447    - accounts
1448    - profiles
1449    - messagequeue:messageq
1450
1451  accounts:
1452    image: plm-accounts
1453
1454  profiles:
1455    image: plm-profiles
1456
1457  db:
1458    image: mongo
1459    volumes:
1460      - ~/.mongodb/data:/data/db
1461    ports:
1462      - "27017:27017"
1463
1464  links:
1465    - accounts
1466    - profiles
1467    - messagequeue:messageq
1468
1469  accounts:
1470    image: plm-accounts
1471
1472  profiles:
1473    image: plm-profiles
1474
1475  db:
1476    image: mongo
1477    volumes:
1478      - ~/.mongodb/data:/data/db
1479    ports:
1480      - "27017:27017"
1481
1482  links:
1483    - accounts
1484    - profiles
1485    - messagequeue:messageq

```

```

1  nginx:~
2    --image: nginx
3    --ports:~
4    - - "80:80"~
5    ~
6  messagequeue:~
7    --image: rabbitmq:3-management~
8    --ports:~
9    - - "5672:5672"~
10   - - "15672:15672"~
11   ~
12  plm:~
13    --image: webplm~
14    --volumes:~
15    - - "~/plm:/root/.plm"~
16    - - "~/webPLM/logs:/app/webplm-dist/logs"~
17    --ports:~
18    - - "443:9443"~
19    --environment:~
20    - - GITHUB_CLIENT_SECRET:~
21    - - GOOGLE_CLIENT_SECRET:~
22    - - PLMACCOUNTS_CLIENT_SECRET:~
23    - - GITHUB_ACCESS_TOKEN:~
24    --links:~
25    - - accounts
26    - - profiles
27    - - messagequeue:messageq~
28    ~
29  accounts:~
30    --image: plm-accounts~

```

```

20    - - GITHUB_CLIENT_SECRET:~
21    - - GOOGLE_CLIENT_SECRET:~
22    - - PLMACCOUNTS_CLIENT_SECRET:~
23    - - GITHUB_ACCESS_TOKEN:~
24    --links:~
25    - - accounts
26    - - profiles
27    - - messagequeue:messageq~
28    ~
29  accounts:~
30    --image: plm-accounts~
31    --ports:~
32    - - "9000:3000"~
33    --links:~
34    - - db~
35    ~
36  profiles:~
37    --image: plm-profiles~
38    --ports:~
39    - - "8080:3000"~
40    --links:~
41    - - db~
42    ~
43  db:~
44    --image: mongo~
45    --volumes:~
46    - - "~/mongodb/data:/data/db"~
47    --ports:~
48    - - "27017:27017"~
49    ~

```

Assessment of user's code

Docker-compose

- Tool to easily deploy multi-containers applications

```
docker-compose.yml
1  nginx:
2    image: nginx
3    ports:
4      - "80:80"
5
6  messagequeue:
7    image: rabbitmq:3-management
8    ports:
9      - "5672:5672"
10     - "15672:15672"
11
12  plm:
13    image: webplm
14    volumes:
15      - ~/.plm:/root/.plm
16      - ~/webPLM/logs:/app/webplm-dist/logs
17    ports:
18      - "443:9443"
19    environment:
20      GITHUB_CLIENT_SECRET:
21      GOOGLE_CLIENT_SECRET:
22      PLMACCOUNTS_CLIENT_SECRET:
23      GITHUB_ACCESS_TOKEN:
24    links:
25      - accounts
26      - profiles
27      - messagequeue:messageq
28
29  accounts:
30    image: plm-accounts
31
32  profiles:
33    image: plm-profiles
34
35  db:
36    image: mongo
37    volumes:
38      - ~/.mongodb/data:/data/db
39    ports:
40      - "27017:27017"
41
42  links:
43    - accounts
44    - profiles
45    - messagequeue:messageq
46
47  accounts:
48    image: plm-accounts
49    ports:
50      - "9000:3000"
51    links:
52      - db
53
54  profiles:
55    image: plm-profiles
56    ports:
57      - "8080:3000"
58    links:
59      - db
60
61  db:
62    image: mongo
63    volumes:
64      - ~/.mongodb/data:/data/db
65    ports:
66      - "27017:27017"
```

- Deploy environment with *docker-compose up*

Assessment of user's code

Docker in our case

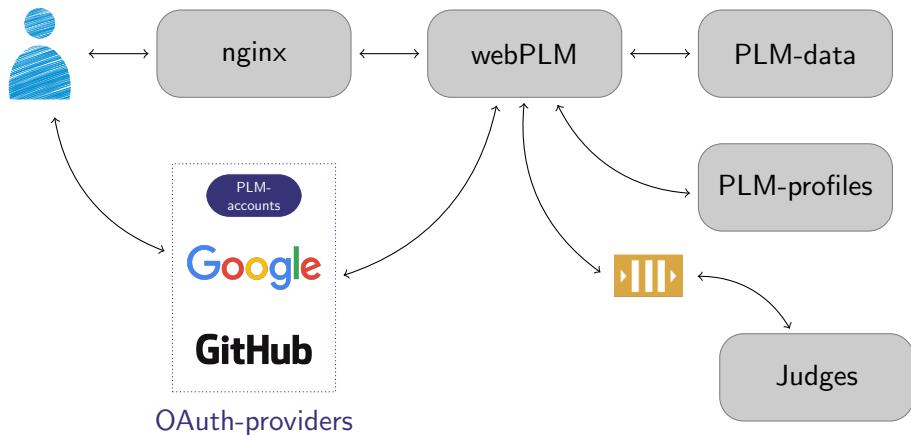
- Deploy easily all components
- Restart judges automatically
- Limit users' mischiefs

Outline

- 1 Presentation of PLM
 - Purposes
 - Demo
 - About PLM
 - Architecture
- 2 To a web app
 - Goals
 - How?
- 3 Assessment of user's code
 - Challenges
 - Extraction of the execution component
 - Docker
- 4 Result
- 5 Next steps

Result

Current architecture



Result

Live-session in TELECOM Nancy

- Used in TELECOM Nancy in September 2015
- 30 hours of live testing with 100 students

Result

Live-session in TELECOM Nancy

- Used in TELECOM Nancy in September 2015
- 30 hours of live testing with 100 students
- Engine is (almost) working fine...
- ... but user experience needs to be improved!

- Scalability issues:
 - Work well with small exercises
 - Can't cope with workload of larger exercises

Result

Live-session in TELECOM Nancy

- Scalability issues:
 - Work well with small exercises
 - Can't cope with workload of larger exercises
- No tools for monitoring set up...

Result

Live-session in TELECOM Nancy

- Scalability issues:
 - Work well with small exercises
 - Can't cope with workload of larger exercises
- No tools for monitoring set up...
- ... so the bottleneck is unknown.

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Next steps

Refactor the code

- Rushed to release a stable version before September 2015...
- Needed to clean some parts of the code
- Merged local and centralized mode branches

Next steps

Simplify workflow to adapt the content

- Store most of content inside PLM
- Heavy and error prone workflow
- Need to extract the content from PLM's jar
- Allow to implement an exercise editor

Next steps

Solve performance issues

- Set up some monitoring tools
- Perform some load testing to identify the bottleneck

Thanks for your attention, any questions?